18423

C55.418/7:

NAUTICAL CHART 18423

BELLINGHAM TO EVERETT
Including San Juan Islands
WASHINGTON

MERCATOR PROJECTION AT SCALE 1:80,000
SOUNDINGS IN FATHOMS
(FATHOMS AND FEET TO ELEVEN FATHOMS)
AT MEAN LOWER LOW WATER IN U.S. TERRITORY
AT LOWEST NORMAL TIDES IN CANADIAN TERRITORY
North American Datum of 1983
(World Geodetic System 1984)

HEIGHTS
Heights in feet above Mean High Water

AUTHORITIES
Hydrography and topography by the National Ocean Service, Charting and Geodetic Services with additional data from the Corps of Engineers, Geological Survey, Defense Mapping Agency, and U.S. Coast Guard.

ABBREVIATIONS
For complete list of Symbols and Abbreviations, see Chart No. 1

SUPPLEMENTAL INFORMATION
Consult U.S. Coast Pilot 7 for important supplemental information

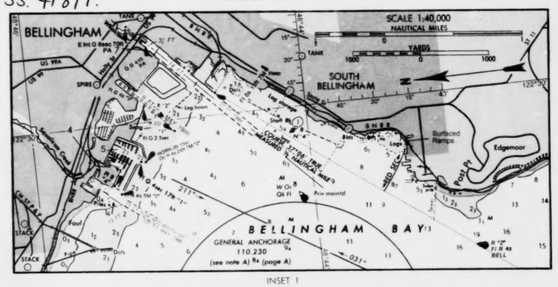
CAUTION
This chart has been corrected from the Notice to Mariners published weekly by the Defense Mapping Agency Hydrographic/Topographic Center, the Canadian Ministry of Transport and the Local Notice to Mariners issued periodically by each U.S. Coast Guard district to the date shown in the lower left-hand corner.

HORIZONTAL DATUM
The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83) and for charting purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic positions referred to the North American Datum of 1927 must be corrected an average of 0.642" southward and 4.616" westward to agree with this chart.

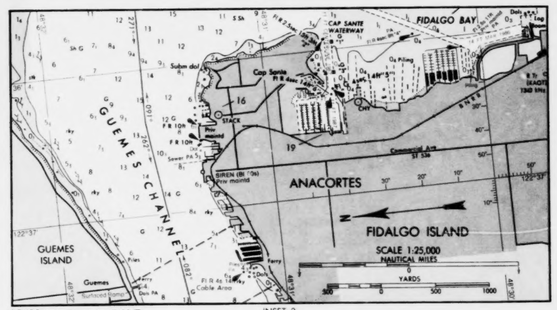
COURSES
Directions are given in International Nautical Miles. Courses are TRUE and must be CORRECTED for any variation and compass deviation.

Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

Formerly 184-SC, 1st Edition, 1960



INSET 1



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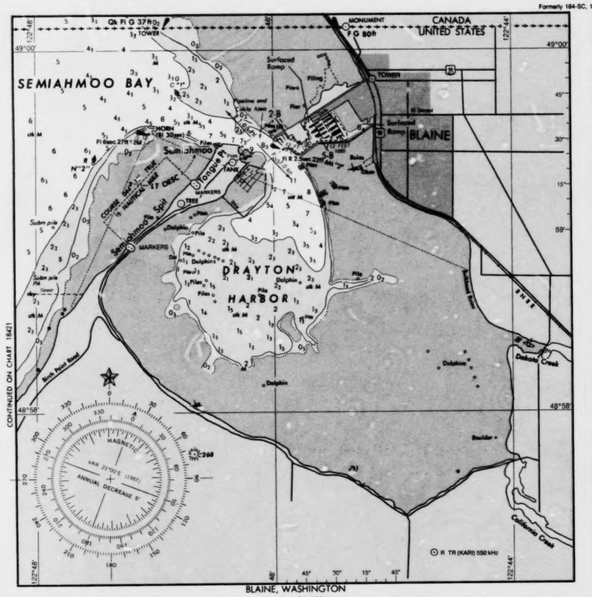
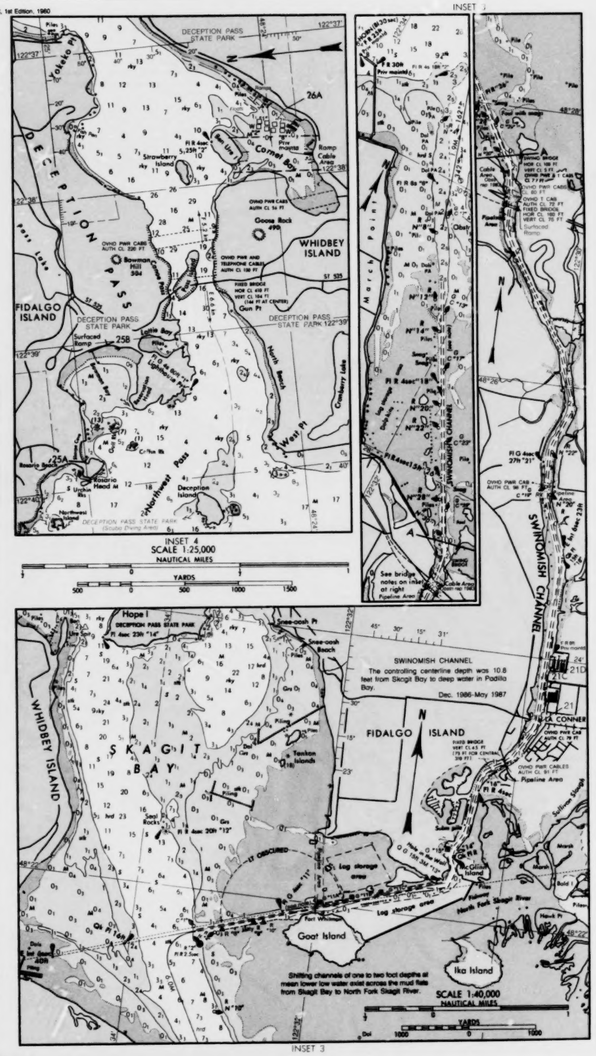


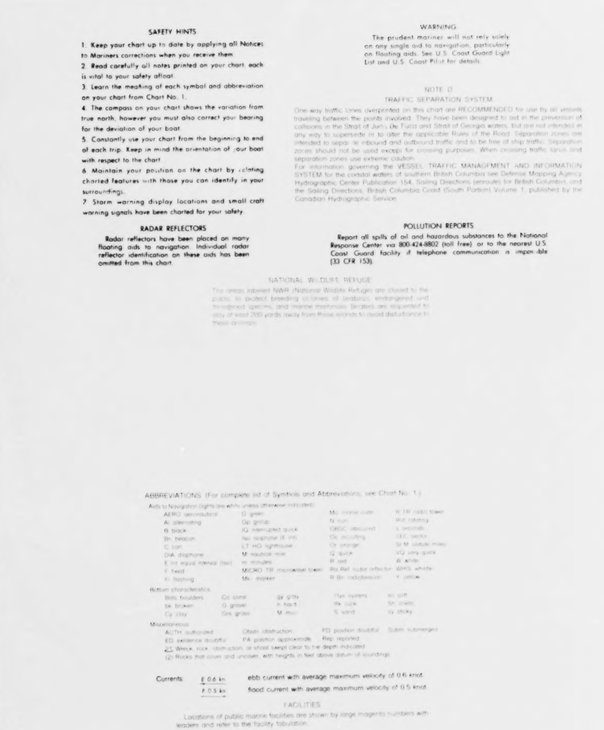
LOGARITHMIC SPEED SCALE

1 2 3 4 5 6 7 8 9 10 15 20 25 30 40 50 60

To find SPEED, place one point of dividers on distance run (in any unit) and the other on minutes run. Without changing divider spread, place right point on 60 and left point will then indicate speed in units per hour. Example: with 4.0 nautical miles run in 15 minutes, the speed is 16.0 knots

FRIDAY HARBOR


INSET 4
SCALE 1:25,000
NAUTICAL MILES
YARDS
DECEPTION PASS STATE PARK
DECEPTION PASS
WHIDBEY ISLAND
FIDALGO ISLAND
Hope I.
SWINOMISH CHANNEL
The controlling centerline depth was 10.8 feet from Skagit Bay to deep water in Padilla Bay.
Dec. 1986-May 1987
SKAGIT BAY
WHIDBEY ISLAND
FIDALGO ISLAND
Goat Island
Ika Island
Shifting channels of one to two foot depths at mean lower low water exist across the mud flats from Skagit Bay to North Fork Skagit River.
SCALE 1:40,000
NAUTICAL MILES
INSET 3



SAFETY HINTS

1. Keep your chart up to date by applying all Notices to Mariners corrections when you receive them.
2. Read carefully all notes printed on your chart; each is vital to your safety afloat.
3. Learn the meaning of each symbol and abbreviation on your chart from Chart No. 1.
4. The compass on your chart shows the variation from true north, however you must also correct your bearing for the deviation of your boat.
5. Constantly use your chart from the beginning to end of each trip. Keep mind the orientation of your boat with respect to the chart.
6. Maintain your position on the chart by plotting charted features with those you can identify in your surroundings.
7. Storm warning display locations and small craft warning signals have been charted for your safety.

RADAR REFLECTORS

Radar reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

WARNING

The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.

NOTE D

TRAFFIC SEPARATION SYSTEM

One way traffic lanes overprinted on this chart are RECOMMENDED to use by all vessels traveling between the points involved. They have been designed to aid in the prevention of collisions in the Strait of Juan de Fuca and Strait of Georgia waters, but are not intended in any way to supersede or to alter the applicable Rules of the Road. Separation zones are intended to segregate inbound and outbound traffic and to be free of ship traffic. Separation zones should not be used except for crossing purposes. When crossing traffic lanes, and separations zones use extreme caution.
For information governing the VESSEL TRAFFIC MANAGEMENT AND INFORMATION SYSTEM for the corridor waters of southern British Columbia see Defense Mapping Agency Hydrographic Center Publication 154, Sailing Directions (enroute) for British Columbia, and the Sailing Directions, British Columbia Coast (South Portion) Volume 1, published by the Canadian Hydrographic Service.

POLLUTION REPORTS

Report all spills of oil and hazardous substances to the National Response Center via 800-424-8802 (toll free) or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 153).

NATIONAL WILDLIFE REFUGE

The areas indicated NWR (National Wildlife Refuge) are closed to the public to protect breeding colonies of seabirds, endangered and threatened species, and marine mammals. Boaters are requested to stay at least 200 yards away from those islands to avoid disturbance to these animals.

ABBREVIATIONS (For complete list of Symbols and Abbreviations, see Chart No. 1)

Aids to Navigation (lights are white unless otherwise indicated):
AERO aeronautical; Al alternating; Bn beacon; C can; Dph diaphone; E ev equal interval (flash); F fixed; Fl flashing
G green; Gp group; Ho horn; Ibn iridescent buoy; Iso isophase; LFl long flash; LT Lighthouse; M nautical mile; m minutes; MICRO TR microwave tower; Mo(A) Morse code letter A; Oc occulting; Or orange; Q quick; R red; RACON radar beacon; Ra reflector; Ro racon; S sec seconds; Sp spark; VQ very quick; W white; Y yellow

Bottom characteristics:
Bk blackish; Co coral; Gr gritty; Grs grass; M mud; Rk rock; S sand; Sh shells; Sft soft; Stk sticky; Wd weed

Miscellaneous:
AUTH authorized; Obstn obstruction; PD position doubtful; Subm submerged; ED existence doubtful; PA position approximate; Rep reported; Wk wreck; rock, obstruction, or shoal swept clear to the depth indicated; (2) Rocks that cover and uncover, with heights in feet above datum of soundings.

Currents: 0.6 kn ebb current with average maximum velocity of 0.6 knot; 0.5 kn flood current with average maximum velocity of 0.5 knot.

FACILITIES
Locations of public marine facilities are shown by large magenta numbers with leaders and refer to the facility tabulation.

RULES OF THE ROAD
ABRIDGED

Motorless craft have the right-of-way in almost all cases. Sailing vessels and motorboats less than sixty five feet in length, shall not hamper, in a narrow channel, the safe passage of a vessel which can navigate only inside that channel.
A motorboat being overtaken has the right-of-way.
Motorboats approaching head to head or nearly so should pass port to port.
When motorboats approach each other at right angles or obliquely, the boat on the right has the right-of-way in most cases.
Motorboats must keep to the right in narrow channels, when safe and practicable.
Mariners are urged to become familiar with the complete text of the Rules of the Road in U.S. Coast Guard publication "Navigation Rules".

CAUTION
Only marine radiobeacons have been calibrated for surface use. Limitations on the use of certain other radio signals on aids to marine navigation can be found in the U.S. Coast Guard Light Lists and Defense Mapping Agency Publication 117.

Radio direction-finder bearings to commercial broadcasting stations are subject to error and should be used with caution.
Station positions are shown thus ⊙(Accurate location) ◎(Approximate location)

NOTE A
Navigation regulations are published in Chapter 2, U.S. Coast Pilot 7. Additions or revisions to Chapter 2 are published in the Notices to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, 13th Coast Guard District in Seattle, Wash., or at the Office of the District Engineer, Corps of Engineers in Seattle, Wash. Refer to underlined regulation section numbers.

COLREGS, 80-1965, 80-1981 (see note A)
International Regulations for Preventing Collisions at Sea, 1972
The entire area of this chart falls seaward of the COLREGS Demarcation Line.

AIDS TO NAVIGATION
Consult U.S. Coast Guard Light List for supplemental information concerning aids to navigation.

See Canadian Light List for information on Canadian waters.

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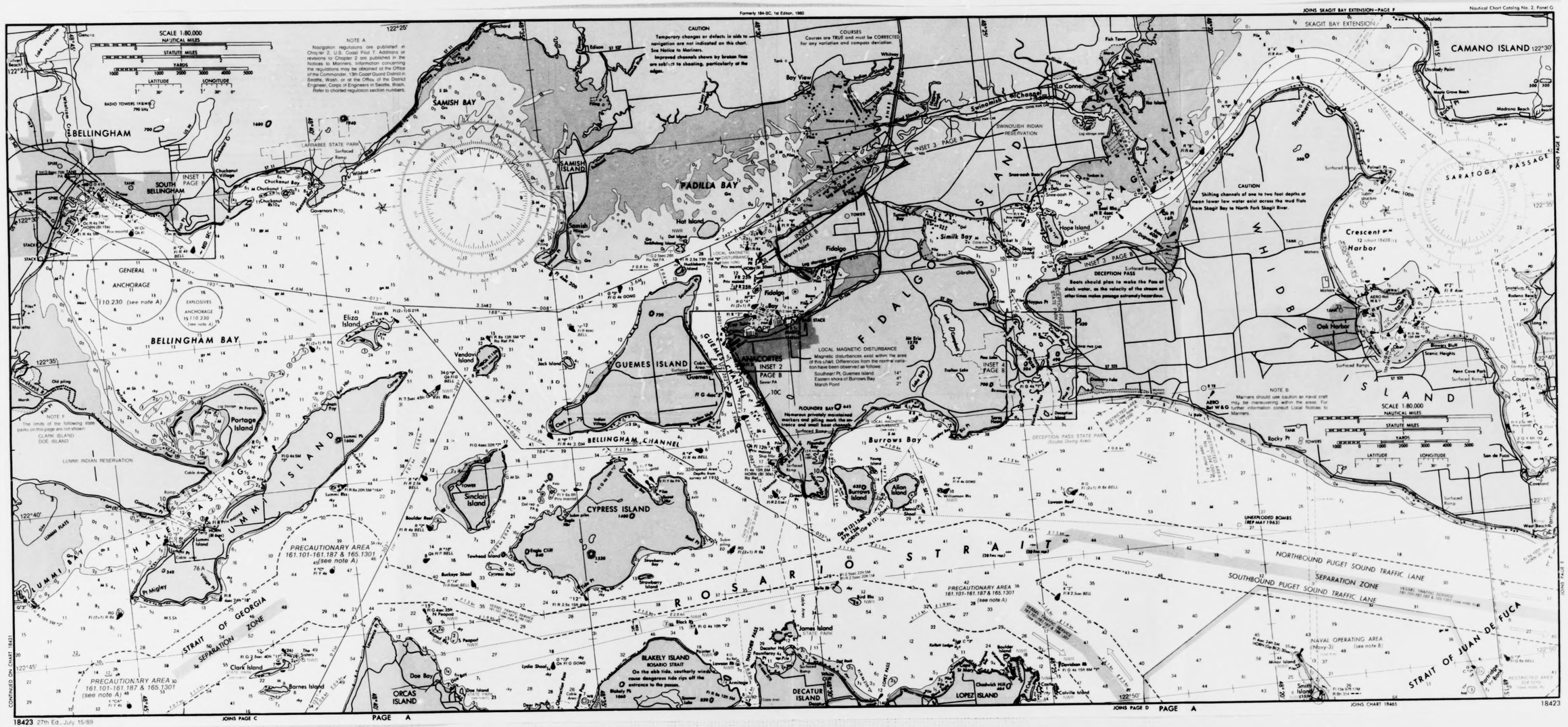

CONTINUED ON CHART 18431

JOINS PAGE C

PAGE A

JOINS PAGE D

PAGE A

JOINS CHART 18465

JOINS PAGE E

18423

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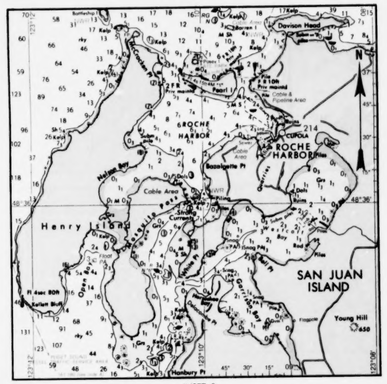
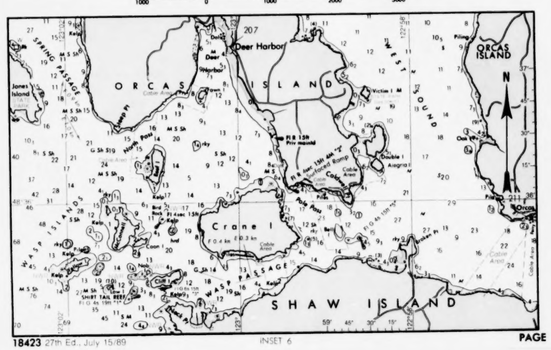
ROCHE HARBOR



INSET 5

SCALE 1:40,000
NAUTICAL MILES
YARDS



INSET 6

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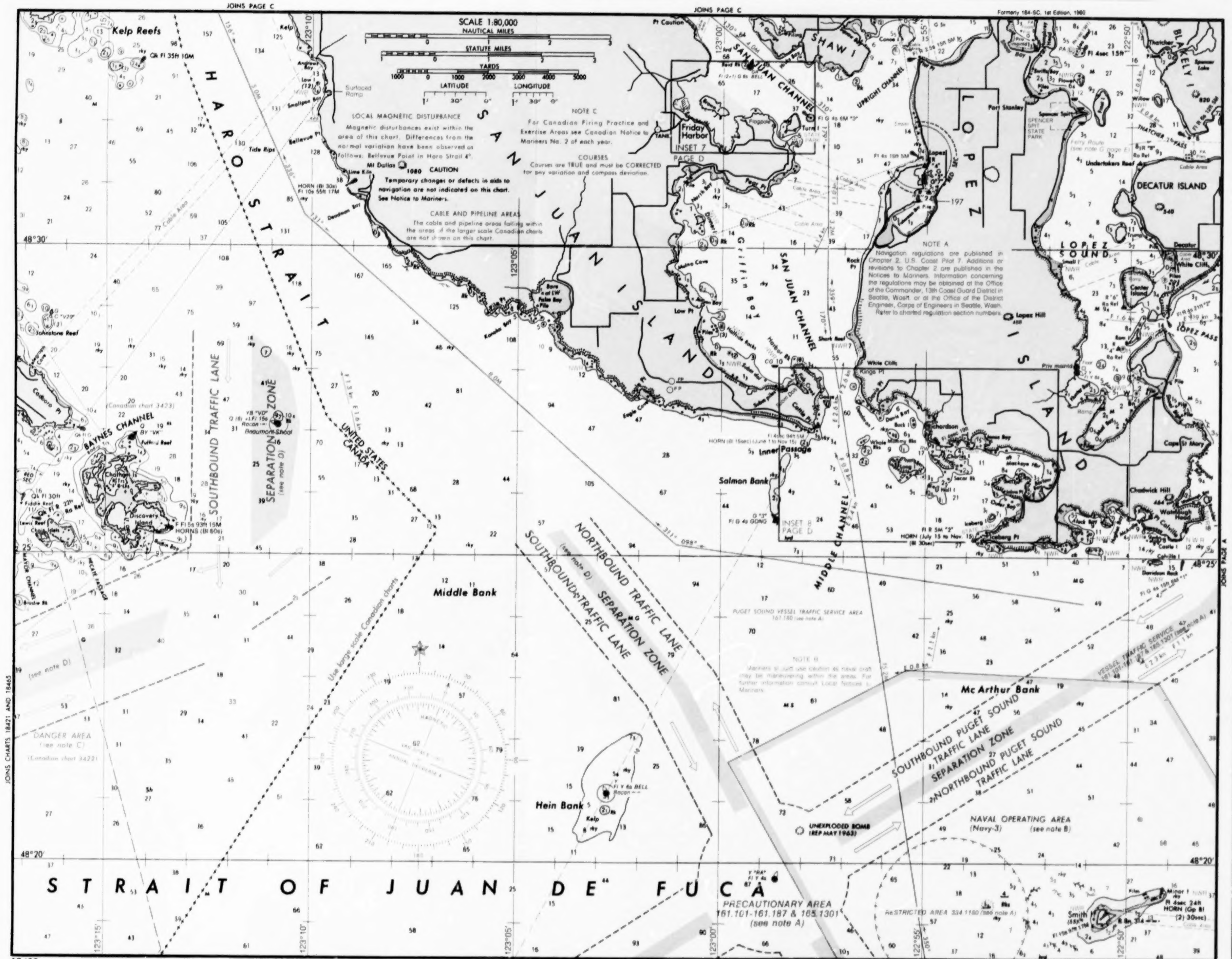
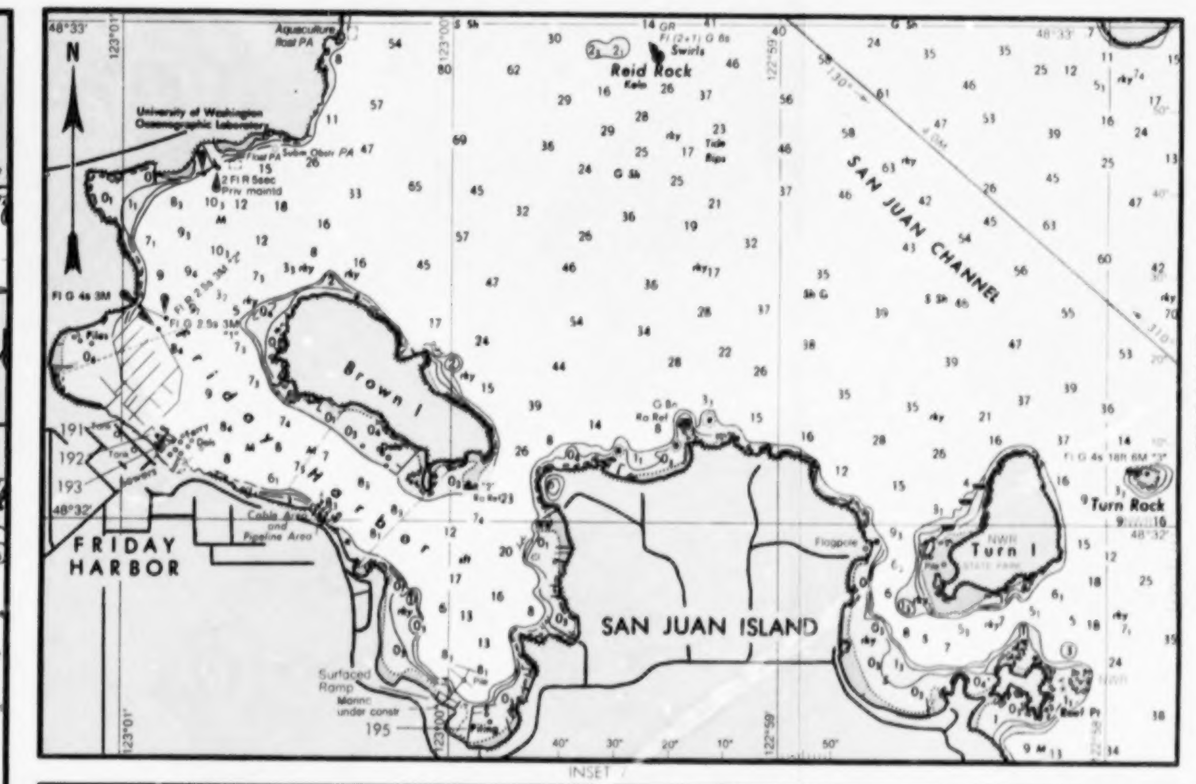
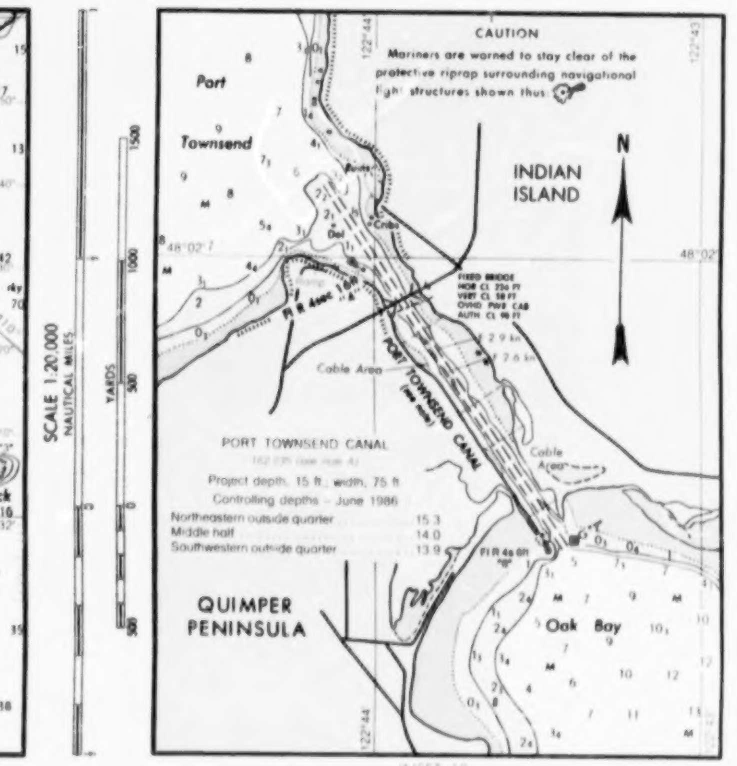
JOINS PAGE C

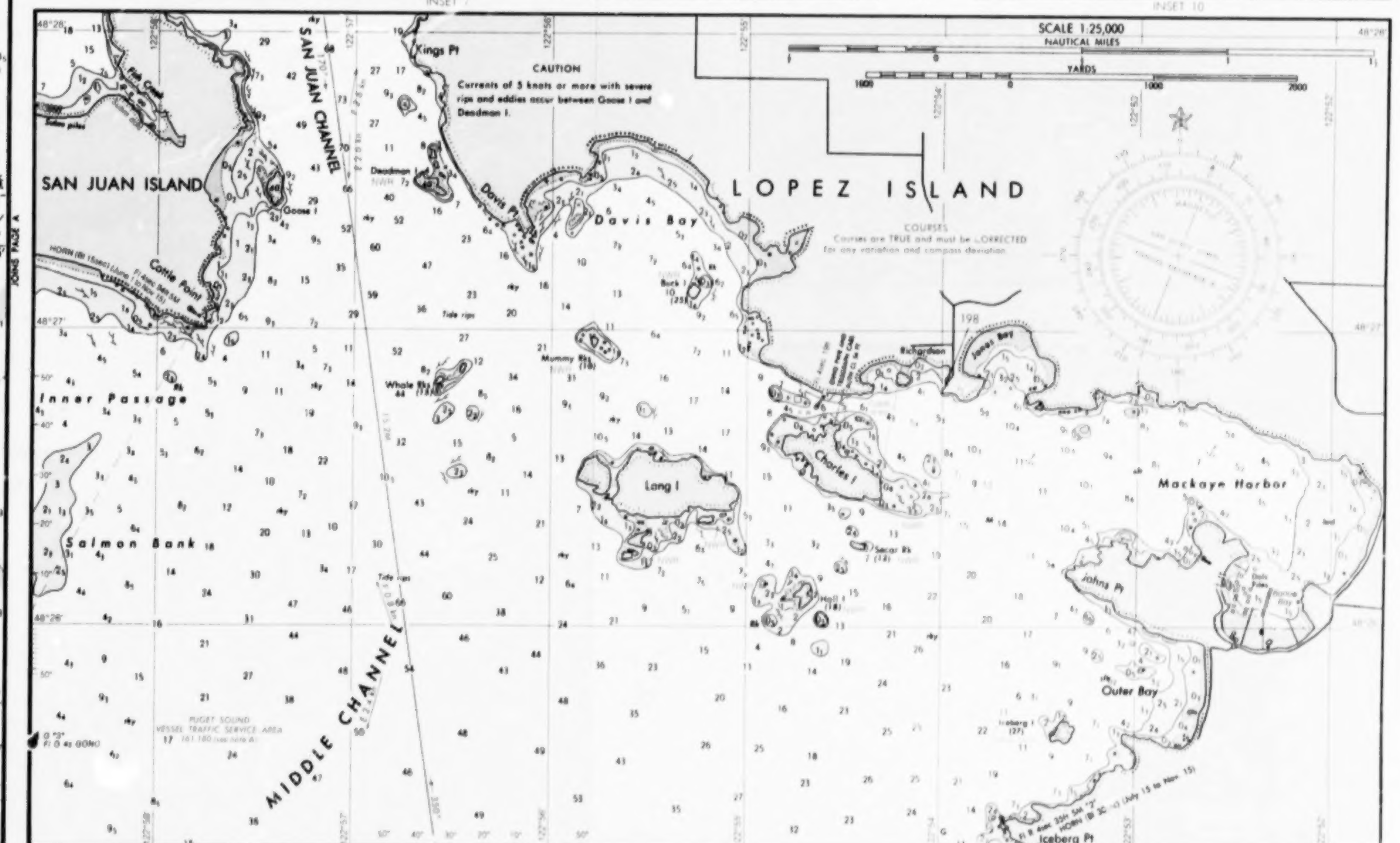


Formerly 184-SC, 1st Edition, 1980
SCALE 1:80,000
NAUTICAL MILES
STATUTE MILES
YARDS
LATITUDE
LONGITUDE
LOCAL MAGNETIC DISTURBANCE
Magnetic disturbances exist within the area of this chart. Differences from the normal variation have been observed as follows: Bellevue Point in Haro Strait 4°.
NOTE C
For Canadian Firing Practice and Exercise Areas see Canadian Notice to Mariners No. 2 of each year.
COURSES
Courses are TRUE and must be CORRECTED for any variation and compass deviation.
CAUTION
Temporary changes or defects in aids to navigation are not indicated on this chart. See Notice to Mariners.
CABLE AND PIPELINE AREAS
The cable and pipeline areas falling within the areas of the larger scale Canadian charts are not shown on this chart.
NOTE A
Navigation regulations are published in Chapter 2, U.S. Coast Pilot 7. Additions or revisions to Chapter 2 are published in the Notices to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, 13th Coast Guard District in Seattle, Wash. or at the Office of the District Engineer, Corps of Engineers in Seattle, Wash. Refer to charted regulation section numbers.
NOTE B
Mariners should use caution as naval craft may be maneuvering within the areas. For further information consult Local Notices to Mariners.
Kelp Reefs
HARO STRAIT
SAN JUAN ISLAND
LOPEZ ISLAND
SHAW I
DECATUR ISLAND
BLAKELY I
LOPEZ SOUND
SAN JUAN CHANNEL
UPRIGHT CHANNEL
Griffin Bay
Friday Harbor
INSET 7
PAGE D
INSET 8
PAGE D
BAYNES CHANNEL
Johnstone Reef
Discovery Island
SOUTHBOUND TRAFFIC LANE
SEPARATION ZONE
(see note D)
Beaumont Shoal
UNITED STATES
CANADA
Middle Bank
NORTHBOUND TRAFFIC LANE
SEPARATION ZONE
SOUTHBOUND TRAFFIC LANE
MIDDLE CHANNEL
Salmon Bank
Inner Passage
Lopez Hill
White Cliffs
Kings Pt
Cattle Pt
Iceberg Pt
LOPEZ PASS
Thatcher Pass
Undertakers Reef
Spencer Spit
Port Stanley
Chadwick Hill
Watmough Head
Cape St Mary
Davidson Rock
PUGET SOUND VESSEL TRAFFIC SERVICE AREA
161.180 (see note A)
Mc Arthur Bank
SOUTHBOUND PUGET SOUND TRAFFIC LANE
SEPARATION ZONE
NORTHBOUND PUGET SOUND TRAFFIC LANE
VESSEL TRAFFIC SERVICE
161.101-161.187 & 165.1301 (see note A)
Hein Bank
DANGER AREA
(see note C)
(Canadian chart 3422)
Use large scale Canadian charts
UNEXPLODED BOMB
(REP MAY 1963)
NAVAL OPERATING AREA
(Navy-3) (see note B)
RESTRICTED AREA 334.1180 (see note A)
Smith I
Minor I
STRAIT OF JUAN DE FUCA
PRECAUTIONARY AREA
161.101-161.187 & 165.1301
(see note A)
48°30′
48°25′
48°20′
123°15′
123°10′
123°05′
123°00′
122°55′
122°50′
JOINS CHARTS 18421 AND 18465





SCALE 1:20,000
NAUTICAL MILES
YARDS
CAUTION
Mariners are warned to stay clear of the protective riprap surrounding navigational light structures shown thus:
Port Townsend
INDIAN ISLAND
PORT TOWNSEND CANAL
Cable Area
PORT TOWNSEND CANAL
Project depth, 15 ft; width, 75 ft
Controlling depths - June 1986
Northeastern outside quarter 15.3
Middle half 14.0
Southwestern outside quarter 13.9
QUIMPER PENINSULA
Oak Bay
INSET 10



SCALE 1:25,000
NAUTICAL MILES
YARDS
CAUTION
Currents of 5 knots or more with severe rips and eddies occur between Goose I and Deadman I.
Kings Pt
SAN JUAN ISLAND
SAN JUAN CHANNEL
LOPEZ ISLAND
COURSES
Courses are TRUE and must be CORRECTED for any variation and compass deviation.
Davis Bay
Davis Pt
Goose I
Deadman I
Cattle Point
Inner Passage
Salmon Bank
Whale Rks
Mummy Rks
Long I
Charles I
Richardson
Jones Bay
Mackaye Harbor
Johns Pt
Outer Bay
Secar Rk
Hall I
Iceberg I
Iceberg Pt
MIDDLE CHANNEL
PUGET SOUND VESSEL TRAFFIC SERVICE AREA

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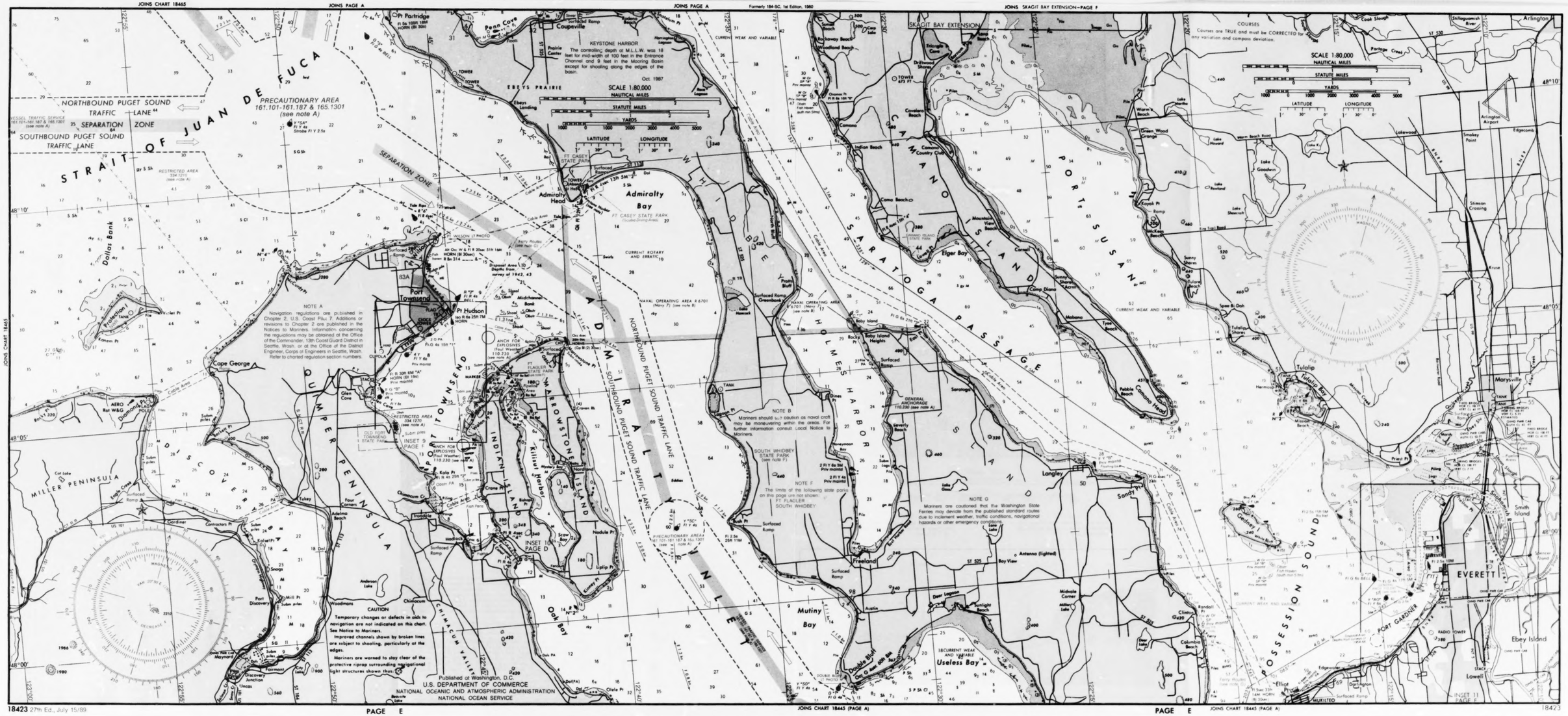
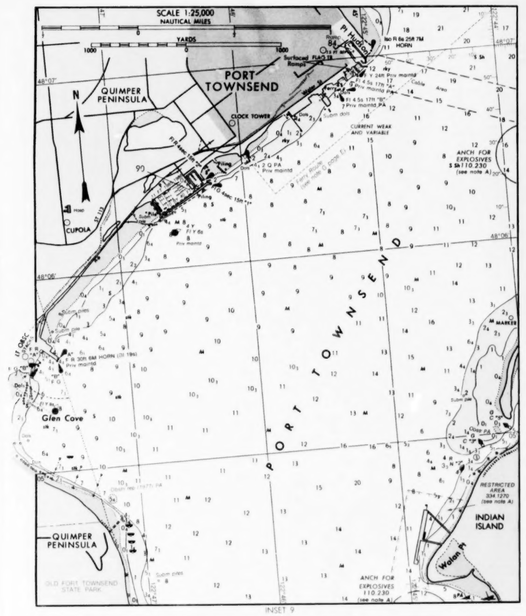
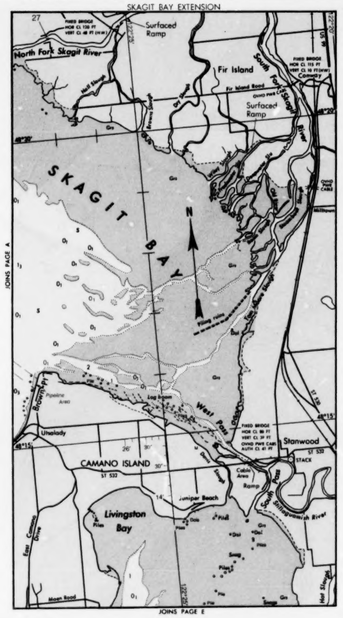
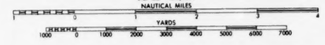

STRAIT OF JUAN DE FUCA
PRECAUTIONARY AREA 161.101-161.187 & 165.1301 (see note A)
NORTHBOUND PUGET SOUND TRAFFIC LANE
SEPARATION ZONE
SOUTHBOUND PUGET SOUND TRAFFIC LANE
SEPARATION ZONE
NORTHBOUND PUGET SOUND TRAFFIC LANE
SOUTHBOUND PUGET SOUND TRAFFIC LANE
ADMIRALTY INLET
PUGET SOUND
SARATOGA PASSAGE
POSSESSION SOUND
PORT GARDNER
KEYSTONE HARBOR
The controlling depth at M.L.L.W. was 18 feet for mid-width of 100 feet in the Entrance Channel and 9 feet in the Mooring Basin except for shoaling along the edges of the basin.
Oct. 1987
SCALE 1:80,000
NAUTICAL MILES
STATUTE MILES
YARDS
LATITUDE
LONGITUDE
COURSES
Courses are TRUE and must be CORRECTED for any variation and compass deviation.
NOTE A
Navigation regulations are published in Chapter 2, U.S. Coast Pilot 7. Additions or revisions to Chapter 2 are published in the Notices to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, 13th Coast Guard District in Seattle, Wash. or at the Office of the District Engineer, Corps of Engineers in Seattle, Wash. Refer to charted regulation section numbers.
NOTE B
Mariners should caution as naval craft may be maneuvering within the areas. For further information consult Local Notice to Mariners.
NOTE F
The limits of the following state parks on this page are not shown:
FT. FLAGLER
SOUTH WHIDBEY
NOTE G
Mariners are cautioned that the Washington State Ferries may deviate from the published standard routes due to inclement weather, traffic conditions, navigational hazards or other emergency conditions.
CAUTION
Temporary changes or defects in aids to navigation are not indicated on this chart. See Notice to Mariners.
Improved channels shown by broken lines are subject to shoaling, particularly at the edges.
Mariners are warned to stay clear of the protective riprap surrounding navigational light structures shown thus:
Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
Port Townsend
Admiralty Bay
Admiralty Head
Point Partridge
Coupeville
Penn Cove
Ebeys Landing
Dallas Bank
Cape George
Diamond Point
Miller Peninsula
Port Discovery
Discovery Junction
Protection Island
Marrowstone Island
Indian Island
Oak Bay
Mutiny Bay
Double Bluff
Useless Bay
Holmes Harbor
Whidbey Island
Camano Island
Elger Bay
Baby Island
Langley
Freeland
Everett
Mukilteo
Edgecomb
Tulalip
Marysville
Arlington
Smith Island
Ebey Island
Lowell
Gedney Island
Possession Bar
Camano Head
Pebble Beach
Mountain View Beach
Indian Beach
Woodland Beach
Rockaway Beach
Driftwood Shores
Cavalero Beach
Camano Country Club
Lake Goodwin
Lake Howard
Lake Shoecraft
Lake Roberts
Lake Stevens
Lake Kathryn
Lake Ki
Lake Weston
Lake Rowland
Lake Shoecraft
Tulalip Bay
Tulalip Shores
Priest Point
Smokey Point
Stimson Crossing
Lakewood
Arlington Airport
Warm Beach
Green Wood Grange
Sunny Shores
Sunny Shores Resort
Camano Beach
Cama Beach
Kayak Pt
Lake Howard
Warm Beach Boat Ramp
Tulalip Boat Ramp
Priest Point Park
Lake Stevens
Lake Goodwin
Lake Shoecraft
Lake Roberts



INSET 9

DOUBLE BLUFF LIGHT

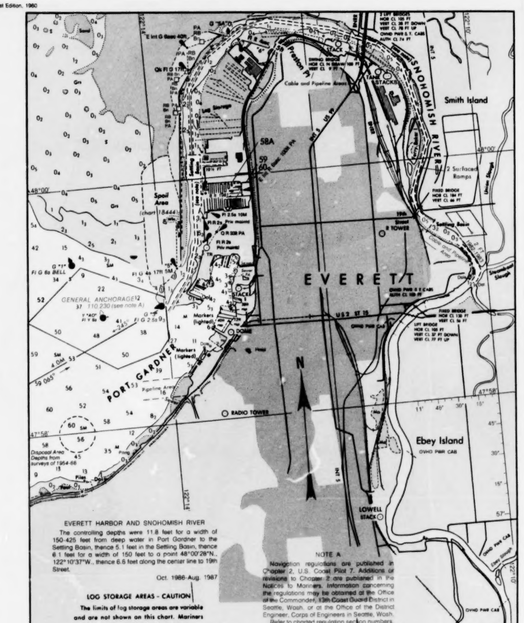




CAUTION
Small craft should stay clear of large commercial and government vessels even if small-craft have the right-of-way.

CAUTION
All craft should avoid areas where the skin divers flag, a red square with a diagonal white stripe, is displayed.

POINT WILSON LIGHT


EVERETT
Smith Island
SNOHOMISH RIVER
SBA
PORT GARDNER
Ebey Island
LOWELL STACK
RADIO TOWER
GENERAL ANCHORAGE 37.110.230 (see note A)
Cable and Pipeline Area
Dispersal Area Depths from surveys of 1954-66
EVERETT HARBOR AND SNOHOMISH RIVER
The controlling depths were 11.8 feet for a width of 150-420 feet from deep water in Port Gardner to the Setting Basin, thence 5.1 feet in the Setting Basin, thence 6.1 feet for a width of 150 feet to a point 48°00'26"N., 122°10'37"W., thence 6.6 feet along the center line to 19th Street.
Oct. 1986-Aug. 1987
LOG STORAGE AREAS - CAUTION
The limits of log storage areas are variable and are not shown on this chart. Mariners should exercise caution in these areas.
NOTE A
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SCALE 1:40,000
NAUTICAL MILES
YARDS

INSET 11

CAUTION
CHANGES in BUOYAGE

Mariners are advised that authorized aids to navigation are being changed to conform to maritime standards of the International Association of Lighthouse Authorities Maritime Buoyage System, Region B. Significant changes are: black port hand buoys to green; black and white vertically striped buoys to red and white vertically striped buoys, and lateral lights from white to red or green as appropriate. Changes to aids to navigation will be announced in the Defense Mapping Agency Hydrographic/Topographic Center weekly Notice to Mariners and the U.S. Coast Guard Local Notice to Mariners.

NOAA nautical charts are constructed to exacting standards and are designed to promote safe navigation. Since our waterways are subject to continual change, the National Ocean Service encourages chart users to submit corrections or comments for the improvement of this product to the Director, Charting and Geodetic Services (N/CG22), National Ocean Service, NOAA, Rockville, Maryland 20852. By working together, we can make our activities safer and more enjoyable.

Thomas J. Maginnis
Assistant Administrator for Ocean Services
and Coastal Zone Management

PORT TOWNSEND, WASHINGTON

Predicted times and heights of high and low water Pacific Standard Time For Daylight Saving Use 1 Hour

NOVEMBER 1989		DECEMBER 1989		JANUARY 1990		FEBRUARY 1990	
Day	Time Ht	Day	Time Ht	Day	Time Ht	Day	Time Ht
1	0142 8.4	1	0234 8.2	1	0317 8.2	1	0400 8.1
	0748 6.6		0827 6.5		0903 6.6		0933 6.8
	1354 9.2		1437 9.2		1513 9.3		1548 9.2
	2000 5.8		2044 5.9		2116 6.0		2145 6.1
2	0228 8.5	2	0317 8.3	2	0358 8.3	2	0439 8.2
	0833 6.7		0910 6.6		0944 6.7		1015 6.9
	1442 9.3		1523 9.3		1600 9.4		1636 9.3
	2048 5.7		2132 5.8		2205 5.9		2234 6.0
3	0315 8.6	3	0400 8.4	3	0440 8.4	3	0518 8.3
	0919 6.8		0954 6.7		1027 6.8		1058 7.0
	1532 9.4		1611 9.4		1649 9.5		1726 9.4
	2138 5.6		2222 5.7		2256 5.8		2325 5.9
4	0403 8.7	4	0445 8.5	4	0524 8.5	4	0600 8.4
	1007 6.9		1040 6.8		1113 6.9		1143 7.1
	1624 9.5		1701 9.5		1740 9.6		1818 9.5
	2230 5.5		2314 5.6		2350 5.7		
5	0453 8.8	5	0532 8.6	5	0611 8.6	5	0645 8.5
	1058 7.0		1129 6.9		1202 7.0		1232 7.2
	1719 9.6		1754 9.6		1834 9.7		1913 9.6
	2325 5.4						
6	0545 8.9	6	0622 8.7	6	0701 8.7	6	0734 8.6
	1152 7.1		1221 7.0		1254 7.1		1325 7.3
	1817 9.7		1850 9.7		1931 9.8		2011 9.7
7	0041 5.3	7	0015 5.5	7	0054 5.6	7	0126 5.7
	0641 9.0		0715 8.8		0753 8.8		0826 8.7
	1249 7.2		1317 7.1		1350 7.2		1422 7.4
	1918 9.8		1948 9.8		2031 9.9		2112 9.8
8	0142 5.2	8	0113 5.4	8	0154 5.5	8	0229 5.6
	0740 9.1		0811 8.9		0849 8.9		0922 8.8
	1349 7.3		1416 7.2		1450 7.3		1523 7.5
	2021 9.9		2049 9.9		2133 10.0		2216 9.9
9	0245 5.1	9	0214 5.3	9	0258 5.4	9	0334 5.5
	0841 9.2		0910 9.0		0948 9.0		1021 8.9
	1451 7.4		1518 7.3		1553 7.4		1627 7.6
	2126 10.0		2152 10.0		2237 10.1		2322 10.0
10	0350 5.0	10	0317 5.2	10	0403 5.3	10	0440 5.4
	0944 9.3		1011 9.1		1049 9.1		1122 9.0
	1555 7.5		1622 7.4		1658 7.5		1732 7.7
	2232 10.1		2257 10.1		2343 10.2		
11	0456 5.0	11	0422 5.1	11	0509 5.2	11	0547 5.3
	1048 9.4		1113 9.2		1152 9.2		1225 9.1
	1659 7.6		1727 7.5		1804 7.6		1838 7.8
	2339 10.2		2403 10.2				
12	0603 5.0	12	0528 5.1	12	0616 5.2	12	0655 5.3
	1152 9.5		1217 9.3		1256 9.3		1329 9.2
	1803 7.7		1832 7.6		1911 7.7		1945 7.9
13	0044 10.3	13	0634 5.1	13	0024 10.3	13	0103 10.3
	0709 5.0		1322 9.4		0722 5.2		0802 5.3
	1255 9.6		1937 7.7		1359 9.4		1431 9.3
	1905 7.8				2016 7.8		2051 8.0
14	0145 10.4	14	0045 10.4	14	0126 10.4	14	0205 10.4
	0812 5.0		0737 5.1		0824 5.2		0904 5.3
	1354 9.7		1424 9.5		1459 9.5		1530 9.4
	2004 7.9		2037 7.8		2116 7.9		2151 8.1
15	0242 10.5	15	0144 10.5	15	0224 10.5	15	0302 10.5
	0911 5.0		0837 5.1		0922 5.2		1000 5.3
	1450 9.8		1522 9.6		1555 9.6		1625 9.5
	2100 8.0		2134 7.9		2211 8.0		2245 8.2
16	0336 10.6	16	0240 10.6	16	0318 10.6	16	0355 10.6
	1006 5.0		0934 5.1		1016 5.2		1053 5.3
	1543 9.9		1617 9.7		1648 9.7		1717 9.6
	2154 8.1		2228 8.0		2303 8.1		2336 8.3
17	0427 10.7	17	0333 10.7	17	0409 10.7	17	0445 10.7
	1059 5.0		1029 5.1		1107 5.2		1143 5.3
	1634 9.9		1709 9.8		1738 9.8		1806 9.7
	2246 8.2		2320 8.1		2353 8.2		
18	0516 10.8	18	0424 10.8	18	0458 10.8	18	0533 10.8
	1150 5.0		1123 5.1		1156 5.2		1231 5.3
	1724 10.0		1800 9.8		1826 9.8		1854 9.7
	2337 8.3						
19	0604 10.9	19	0513 10.8	19	0545 10.8	19	0620 10.8
	1240 5.0		1216 5.1		1244 5.2		1318 5.3
	1813 10.0		1850 9.9		1913 9.8		1941 9.7
20	0030 8.4	20	0600 10.8	20	0031 8.3	20	0106 8.4
	0651 10.9		1307 5.1		0631 10.8		0706 10.8
	1329 5.0		1939 9.9		1331 5.2		1404 5.3
	1901 10.0				1959 9.8		2027 9.7
21	0122 8.5	21	0044 8.4	21	0116 8.4	21	0150 8.4
	0737 10.9		0646 10.8		0716 10.8		0751 10.8
	1417 5.0		1357 5.1		1418 5.2		1450 5.3
	1948 10.0		2027 9.9		2044 9.8		2113 9.7
22	0213 8.6	22	0130 8.5	22	0200 8.5	22	0234 8.4
	0822 10.9		0731 10.8		0800 10.8		0836 10.8
	1504 5.0		1447 5.1		1504 5.2		1536 5.3
	2034 10.0		2114 9.9		2129 9.8		2159 9.7
23	0303 8.7	23	0216 8.6	23	0244 8.6	23	0318 8.5
	0907 10.9		0816 10.8		0844 10.8		0921 10.8
	1551 5.0		1537 5.1		1550 5.2		1623 5.3
	2120 10.0		2202 9.9		2215 9.8		2246 9.7
24	0353 8.8	24	0303 8.7	24	0329 8.7	24	0403 8.6
	0952 10.9		0902 10.8		0929 10.8		1007 10.8
	1639 5.0		1628 5.1		1637 5.2		1711 5.3
	2207 10.0		2251 9.9		2302 9.8		2334 9.7
25	0444 8.9	25	0351 8.8	25	0416 8.8	25	0450 8.7
	1038 10.9		0949 10.8		1016 10.8		1055 10.8
	1729 5.0		1721 5.1		1726 5.2		1801 5.3
	2256 10.0		2342 9.9		2351 9.8		
26	0537 9.0	26	0441 8.9	26	0506 8.9	26	0540 8.8
	1126 10.9		1038 10.8		1105 10.8		1145 10.8
	1821 5.0		1817 5.1		1818 5.2		1854 5.3
	2348 10.0						
27	0632 9.1	27	0534 9.0	27	0559 9.0	27	0633 8.9
	1216 10.9		1130 10.8		1157 10.8		1238 10.8
	1916 5.0		1916 5.1		1913 5.2		1950 5.3
28	0042 10.0	28	0630 9.1	28	0054 10.0	28	0729 9.0
	0730 9.2		1225 10.8		0654 9.1		1334 10.8
	1309 10.9		2017 5.1		1252 10.8		2049 5.3
	2014 5.0				2011 5.2		
29	0139 10.0	29	0729 9.2	29	0151 10.0	29	0829 9.1
	0830 9.3		1324 10.8		0753 9.2		1435 10.8
	1406 10.9		2120 5.1		1352 10.8		2151 5.3
	2113 5.0				2112 5.2		
30	0239 10.0	30	0831 9.3	30	0251 10.0	30	0933 9.2
	0933 9.4		1427 10.8		0856 9.3		1540 10.8
	1506 10.9		2226 5.1		1456 10.8		2256 5.3
	2215 5.0				2216 5.2		
31	0342 10.0	31	0936 9.4	31	0354 10.0		
	1039 9.5		1533 10.8		1002 9.4		
	1609 10.9		2334 5.1		1603 10.8		
	2320 5.0				2324 5.2		

JULY 1990		AUGUST 1990		SEPTEMBER 1990		OCTOBER 1990	
Day	Time Ht	Day	Time Ht	Day	Time Ht	Day	Time Ht
1	0433 8.0	1	0506 8.0	1	0541 8.1	1	0621 8.3
	1008 6.9		1040 6.8		1116 6.7		1156 6.5
	1622 9.1		1654 9.0		1730 8.9		1809 8.7
	2218 6.2		2253 6.3		2333 6.4		
2	0513 8.1	2	0548 8.1	2	0627 8.2	2	0708 8.3
	1048 7.0		1122 6.9		1200 6.8		1242 6.6
	1703 9.2		1737 9.1		1815 9.0		1856 8.8
	2300 6.3		2337 6.4				
3	0553 8.2	3	0630 8.2	3	0713 8.3	3	0756 8.3
	1128 7.1		1204 7.0		1244 6.9		1329 6.7
	1744 9.3		1820 9.2		1900 9.1		1944 8.9
	2343 6.4						
4	0634 8.3	4	0713 8.3	4	0759 8.4	4	0844 8.4
	1209 7.2		1247 7.1		1329 7.0		1417 6.8
	1826 9.4		1904 9.3		1946 9.2		2033 9.0
5	0027 6.5	5	0058 6.6	5	0146 6.6	5	0235 6.6
	0717 8.4		0758 8.4		0846 8.5		0934 8.5
	1252 7.3		1332 7.2		1416 7.1		1506 6.9
	1910 9.5		1951 9.4		2035 9.3		2124 9.1
6	0112 6.6	6	0146 6.7	6	0236 6.7	6	0327 6.7
	0803 8.5		0846 8.5		0936 8.6		1027 8.6
	1338 7.4		1420 7.3		1506 7.2		1558 7.0
	1958 9.6		2041 9.5		2127 9.4		2217 9.2
7	0200 6.7	7	0236 6.8	7	0328 6.8	7	0421 6.8
	0851 8.6		0936 8.6		1028 8.7		1122 8.7
	1427 7.5		1511 7.4		1600 7.3		1653 7.1
	2049 9.7		2133 9.6		2221 9.5		2312 9.3
8	0251 6.8	8	0329 6.9	8	0422 6.9	8	0518 6.9
	0941 8.7		1028 8.7		1122 8.8		1219 8.8
	1519 7.6		1605 7.5		1656 7.4		1751 7.2
	2142 9.8		2228 9.7		2317 9.6		
9	0344 6.9	9	0424 7.0	9	0519 7.0	9	0617 7.0
	1033 8.8		1122 8.8		1219 8.9		1318 8.9
	1614 7.7		1702 7.6		1755 7.5		1851 7.3
	2238 9.9		2326 9.8				
10	0439 7.0	10	0522 7.1	10	0618 7.1	10	0717 7.1
	1127 8.9		1219 8.9		1318 9.0		1419 9.0
	1711 7.8		1801 7.7		1856 7.6		1952 7.4
	2336 10.0						
11	0536 7.1	11	0622 7.2	11	0719 7.2	11	0819 7.2
	1223 9.0		1317 9.0		1419 9.1		1521 9.1
	1810 7.9		1902 7.8		1958 7.7		2054 7.5
12	0635 7.2	12	0724 7.3	12	0822 7.3	12	0922 7.3
	1321 9.1		1417 9.1		1521 9.2		1624 9.2
	1911 8.0		2004 7.9		2102 7.8		2157 7.6
13	0035 10.1	13	0028 10.2	13	0127 10.2	13	0228 10.2
	0736 7.3		0827 7.4		0926 7.4		1027 7.4
	1421 9.2		1518 9.2		1623 9.3		1727 9.3
	2014 8.1		2108 8.0		2207 7.9		2302 7.7
14	0137 10.2	14	0132 10.3	14	0232 10.3	14	0334 10.3
	0839 7.4		0931 7.5		1031 7.5		1132 7.5
	1523 9.3		1621 9.3		1726 9.4		1829 9.4
	2118 8.2		2213 8.1		2312 8.0		
15	0240 10.3	15	0237 10.4	15	0337 10.4	15	0438 10.4
	0942 7.5		1036 7.6		1136 7.6		1235 7.6
	1625 9.4		1724 9.4		1828 9.5		1928 9.5
	2222 8.3		2317 8.2				
16	0343 10.4	16	0342 10.5	16	0441 10.5	16	0539 10.5
	1045 7.6		1140 7.7		1239 7.7		1335 7.7
	1727 9.5		1826 9.5		1927 9.6		2024 9.6
	2325 8.4						
17	0445 10.5	17	0445 10.6	17	0542 10.6	17	0637 10.6
	1146 7.7		1242 7.8		1339 7.8		1433 7.8
	1827 9.6		1926 9.6		2024 9.7		2117 9.7
18	0545 10.6	18	0545 10.7	18	0639 10.7	18	0732 10.7
	1245 7.8		1341 7.9		1436 7.9		1528 7.9
	1925 9.7		2024 9.7		2119 9.8		2208 9.8
19	0042 8.5	19	0042 8.6	19	0133 8.6	19	0222 8.6
	0642 10.7		0642 10.8		0734 10.8		0824 10.8
	1341 7.9		1436 8.0		1529 8.0		1619 8.0
	2020 9.8		2119 9.8		2211 9.9		2257 9.9
20	0138 8.6	20	0137 8.7	20	0225 8.7	20	0312 8.7
	0736 10.8		0736 10.9		0825 10.9		0913 10.9
	1434 8.0		1528 8.1		1618 8.1		1706 8.1
	2112 9.9		2209 9.9		2300 10.0		2343 10.0
21	0230 8.7	21	0229 8.8	21	0314 8.8	21	0400 8.8
	0827 10.9		0826 11.0		0913 11.0		0959 11.0
	1524 8.1		1617 8.2		1705 8.2		1751 8.2
	2201 10.0		2256 10.0		2346 10.1		
22	0319 8.8	22	0317 8.9	22	0400 8.9	22	0445 8.9
	0915 11.0		0913 11.1		0958 11.1		1042 11.1
	1611 8.2		1703 8.3		1749 8.3		1833 8.3
	2248 10.1		2341 10.1				
23	0405 8.9	23	0403 9.0	23	0444 9.0	23	0527 9.0
	1000 11.1		0958 11.2		1041 11.2		1122 11.2
	1656 8.3		1747 8.4		1831 8.4		1913 8.4
	2333 10.2						
24	0449 9.0	24	0447 9.1	24	0526 9.1	24	0607 9.1
	1043 11.2		1041 11.3		1122 11.3		1201 11.3
	1739 8.4		1830 8.5		1911 8.5		1951 8.5
25	0531 9.1	25	0530 9.2	25	0607 9.2	25	0646 9.2
	1125 11.3		1123 11.4		1202 11.4		1239 11.4
	1821 8.5		1912 8.6		1951 8.6		2029 8.6
26	0012 10.3	26	0012 10.4	26	0048 10.4	26	0125 10.4
	0612 9.2		0613 9.3		0648 9.3		0725 9.3
	1207 11.4		1205 11.5		1242 11.5		1317 11.5
	1903 8.6		1954 8.7		2031 8.7		2107 8.7
27	0054 10.4	27	0055 10.5	27	0129 10.5	27	0204 10.5
	0654 9.3		0656 9.4		0730 9.4		0804 9.4
	1249 11.5		1248 11.6		1323 11.6		1356 11.6
	1945 8.7		2037 8.8		2112 8.8		2146 8.8
28	0136 10.5	28	0139 10.6	28	0211 10.6	28	0244 10.6
	0736 9.4		0739 9.5		0813 9.5		0845 9.5
	1332 11.6		1332 11.7		1405 11.7		1436 11.7
	2028 8.8		2121 8.9		2154 8.9		2227 8.9
29	0219 10.6	29	0224 10.7	29	0254 10.7	29	0325 10.7
	0819 9.5		0824 9.6		0857 9.6		0927 9.6
	1416 11.7		1418 11.8		1448 11.8		1518 11.8
	2112 8.9		2207 9.0		2238 9.0		2309 9.0
30	0303 10.7	30	0311 10.8	30	0338 10.8	30	0407 10.8
	0903 9.6		0911 9.7		0942 9.7		1011 9.7
	1502 11.8		1506 11.9		1533 11.9		1602 11.9
	2158 9.0		2255 9.1		2324 9.1		2353 9.1
31	0349 10.8	31	0400 10.9			31	0451 10.9
	0949 9.7		0959 9.8				1057 9.8
	1550 11.9		1556 12.0				1648 12.0
	2246 9.1		2345 9.2				

NOVEMBER 1990		DECEMBER 1990	
Day	Time Ht	Day	Time Ht
1	0539 11.0	1	0624 11.0
	1147 9.9		1239 9.9
	1744 12.0		1835 12.0
2	0630 11.1	2	0717 11.1
	1240 10.0		1332 10.0
	1841 12.0		1929 12.0
3	0724 11.2	3	0810 11.2
	1336 10.1		1426 10.1
	1939 12.0		2024 12.0
4	0821 11.3	4	0905 11.3
	1435 10.2		1522 10.2
	2040 12.0		2121 12.0
5	0921 11.4	5	1003 11.4
	1537 10.3		1621 10.3
	2144 12.0		2220 12.0
6	1024 11.5	6	1104 11.5
	1641 10.4		1722 10.4
	2249 12.0		2321 12.0
7	1129 11.6	7	1207 11.6
	1746 10.5		1825 10.5
	2355 12.0		
8	1234 11.7	8	1312 11.7
	1852 10.6		1930 10.6
9	0059 12.0	9	0039 12.0
	1339 11.8		1417 11.8
	1958 10.7		2035 10.7
10	0202 12.0	10	0142 12.0
	1444 11.9		1521 11.9
	2103 10.8		2139 10.8
11	0305 12.0	11	0245 12.0
	1548 12.0		1624 12.0
	2207 10.9		2241 10.9
12	0407 12.0	12	0346 12.0
	1650 12.1		1725 12.1
	2309 11.0		2342 11.0
13	0507 12.0	13	0445 12.0
	1750 12.2		1824 12.2
	2409 11.1		
14	0605 12.0	14	0542 12.0
	1847 12.3		1921 12.3
15	0000 11.2	15	0037 11.2
	0701 12.0		0637 12.0
	1941 12.4		2015 12.4
16	0057 11.3	16	0131 11.3
	0755 12.0		0730 12.0
	2033 12.5		2106 12.5
17	0151 11.4	17	0223 11.4
	0847 12.0		0821 12.0
	2123 12.6		2155 12.6
18	0243 11.5	18	0314 11.5
	0937 12.0		0911 12.0
	2212 12.7		2243 12.7
19	0334 11.6	19	0404 11.6
	1026 12.0		1000 12.0
	2300 12.8		2330 12.8
20	0424 11.7	20	0453 11.7
	1114 12.0		1048 12.0
	2347 12.9		
21	0513 11.8	21	0541 11.8
	1201 12.0		1136 12.0
	2434 13.0		1224 13.0
22	0601 11.9	22	0628 11.9
	1247 12.0		1224 12.0
			1312 13.1
23	0048 13.1	23	0715 12.0
	0648 12.0		1312 12.0
	1333 12.0		1400 13.2
24	0135 13.2	24	0802 12.0
	0735 12.0		1400 12.0
	1420 12.0		1449 13.3
25	0222 13.3	25	0850 12.0
	0822 12.0		1449 12.0
	1508 12.0		1539 13.4
26	0309 13.4	26	0939 12.0
	0910 12.0		1539 12.0
	1557 12.0		1630 13.5
27	0357 13.5	27	1029 12.0
	1000 12.0		1630 12.0
	1648 12.0		1723 13.6
28	0447 13.6	28	1121 12.0
	1052 12.0		1723 12.0
	1741 12.0		1818 13.7
29	0539 13.7	29	1215 12.0
	1147 12.0		1818 12.0
	1837 12.0		1916 13.8
30	0634 13.8	30	1311 12.0
	1245 12.0		1916 12.0
	1936 12.0		2017 13.9
		31	1409 12.0
			2017 12.0
			2121 14.0

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